

Journal of

Computational Physics

VOLUME 19, 1975



Academic Press

New York and London

A Subsidiary of Harcourt Brace Jovanovich, Publishers

Copyright © 1975 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

Printed by the St. Catherine Press, Ltd. Bruges, Belgium

CONTENTS OF VOLUME 19

NUMBER 1, SEPTEMBER 1975

T. POSTON AND A. B. BUDGOR. A Geometrical Approach to Calculating the Energy and Frequency Spectra of Crystals	1
D. S. WATANABE. A Numerical Method for the Time-Dependent Krook Kinetic Equation	29
J. C. EILBECK AND G. R. MCGUIRE. Numerical Study of the Regularized Long-Wave Equation I: Numerical Methods	43
BRENDAN B. GODFREY. Canonical Momenta and Numerical Instabilities in Particle Codes	58
JENÖ GAZDAG. Numerical Solution of the Vlasov Equation with the Accurate Space Derivative Method	77
RICHARD S. HIRSH. Higher Order Accurate Difference Solutions of Fluid Mechanics Problems by a Compact Differencing Technique	90
AXEL RUHE. Iterative Eigenvalue Algorithms Based on Convergent Splittings	110

NUMBER 2, OCTOBER 1975

S. ALTEROVITZ AND M. GERSHENSON. A Moments Method Applied to Laplace Transform Technique for Experimental Physics	121
HIROTADA ABE, JUNICHI MIYAMOTO, AND RYOHEI ITATANI. Grid Effects on the Plasma Simulation by the Finite-Sized Particle	134
H. McDONALD AND W. R. BRILEY. Three-Dimensional Supersonic Flow of a Viscous or Inviscid Gas	150
L. C. WELLFORD, JR. AND J. T. ODEN. Discontinuous Finite-Element Approximations for the Analysis of Shock Waves in Nonlinearly Elastic Materials	179
JAMES C. CAVENDISH. Local Mesh Refinement Using Rectangular Blended Finite Elements	211

NOTES

JOSEPH ROSEMAN AND GIDEON ZWAS. Nonlinear Transformations and the Numerical Treatment of Shocks	229
H. W. CRATER AND G. W. REDDIEN. Extrapolation of Finite Difference Approximations for Bound State Equations	236

NUMBER 3, NOVEMBER 1975

M. S. MARINOV, V. S. POPOV, AND V. L. STOLIN. Variational Approach to the Relativistic Two-Center Problem: Critical Internuclear Distance . .	241
ROBERT L. HANEY AND JULIAN M. WRIGHT, JR. The Relationship between the Grid Size and the Coefficient of Nonlinear Lateral Eddy Viscosity in Numerical Ocean Circulation Models	257
CHARLES H. BENNETT. Mass Tensor Molecular Dynamics	267
M. T. SANDFORD II, R. C. ANDERSON, H. G. HORAK, AND J. W. KODIS. Improved, Implicit, Radiation Hydrodynamics	280
C. A. HALL AND J. J. LOWKE. A Non-Self-Adjoint Finite Difference Model of Electron Diffusion Parallel to Electric Fields	297

NOTES

J. P. CHIOU AND T. Y. NA. On the Solution of Troesch's Nonlinear Two-Point Boundary Value Problem Using an Initial Value Method	311
CLIVE TEMPERTON. Algorithms for the Solution of Cyclic Tridiagonal Systems	317
N. M. TEMME. On the Numerical Evaluation of the Modified Bessel Function of the Third Kind	324
ERRATUM	338

NUMBER 4, DECEMBER 1975

LIU CHEN AND HIDEO OKUDA. Theory of Plasma Simulation Using Multipole-Expansion Scheme	339
K. F. KLENK AND A. S. KANOFKY. Evaluation of Proton-Proton Elastic Scattering with Quark Hard Cores Using Glauber and Monte Carlo Methods	353
THOMAS B. GATSKI. On the Numerical Modeling of an Oldroyd-Type Constitutive Equation	376
J. STEPPeler. On a High Accuracy Finite Difference Method	390
E. M. PARMENTIER AND K. E. TORRANCE. Kinematically Consistent Velocity Fields for Hydrodynamic Calculations in Curvilinear Coordinates	404
R. A. NICOLAIDES. On Multiple Grid and Related Techniques for Solving Discrete Elliptic Systems	418

NOTE

B. R. VUJISIĆ AND D. S. PEŠIĆ. A FORTRAN Program for Rotational Analysis of the Spectra of Diatomic Molecules	432
AUTHOR INDEX	435